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# **ECS Maintenance and Operations**

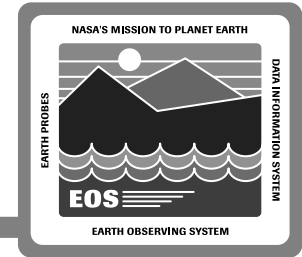
## **Thomas J. Hickey**

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**28 February 1995**

# Presentation Agenda

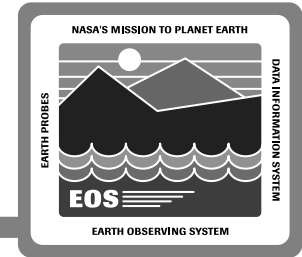
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- **Operations concept**
- **Release A operability**
- **Staffing analyses**
- **Plan development**
- **PDR to CDR**

# Operations Scenarios Goals

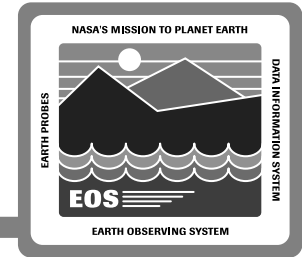
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- **Validation of staffing estimates**
  - **Definition of operational functions and positions**
  - **Work load estimation for operational positions**
  - **Ensure design has sufficient automation and operability to support staffing projections**
- **Validation of operational positions at each center**
  - **Operations functions mapped to operators**
  - **Skill mix of staff**
- **Provide operations context for requirements interpretation**
- **Provide operations context for design and implementation**
- **Support I&T build and thread definition and testing**
- **Address issue of apparent lack of operations concept**

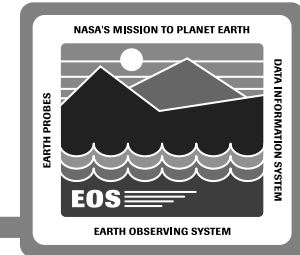
# Operations Scenarios Approach

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- **Develop concepts via discussions and interchanges with developers**
- **Present concepts at Operations Telecons to operations community**
- **Present consolidated concepts at formal reviews**
- **Scenarios placed under change control via Operations Concept Document, DID 604**
  - **Release A concepts at CDR**
  - **Initial Release B concepts at RIR, updated at PDR & CDR as required**

# Operations Telecons



## September

29	30	31	1	2
5	6	7	8	9
12	13	14	15	16
19	20	21	22	23
26	27	28	29	30

## October

3	4	5	6	7
10	11	12	13	14
17	18	19	20	21
24	25	26	27	28

## November

31	1	2	3	4
7	8	9	10	11
14	15	16	17	18
21	22	23	24	25

## December

28	29	30	31	2
5	6	7	8	9
12	13	14	15	16
19	20	21	22	23
26	27	28	29	30

## January

2	3	4	5	6
9	10	11	12	13
16	17	18	19	20
23	24	25	26	27

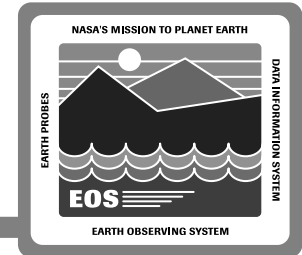
## February

30	31	1	2	3
6	7	8	9	10
13	14	15	16	17
20	21	22	23	24

## March

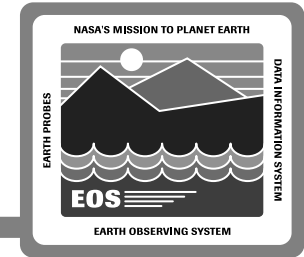
27	28	1	2	3
6	7	8	9	10
13	14	15	16	17
20	21	22	23	24
27	28	29	30	31

# Operations Telecons



- 1 Planning and Scheduling of Ops Support Activities**
- 2 Computer Systems Administration, Operational Readiness, & Performance Management**
- 3 I&T of Science S/W with ECS**
- 4 Operations Resource Baseline Maintenance with the Local System Management**
- 5 Action Item Review and Follow-up**
- 6 & 8 DAAC Ingest/Archive/Distribution Operations**
- 7 Science Data Production Planning**
- 9 ECS Fault Management, TRMM Mission - Release A**
- 10 Performance Management in ECS during TRMM Mission Support at Release A**
- 11 Security and Accountability Management in ECS during TRMM Mission Support at Release A**
- 12 Science Data Production**

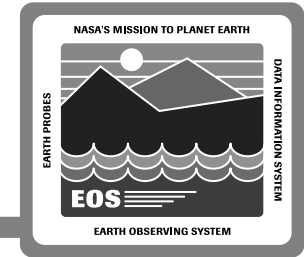
# Candidate Scenarios



- **Data Insertion**
  - **L0**
  - **Media**
- **Data Storage (control, monitor, maintenance)**
  - **Archive**
  - **RAID**
- **Resource Planning**
- **Processing Planning**
- **Processing Execution (control, monitor, QA)**
- **Data Distribution**
  - **Electronic**
  - **Media**
- **Metadata (generation, maintenance)**
- **Data Management (schema, advertising, sessions, subscriptions, data dictionary)**
- **Resource Management (monitor, control, fault management)**
  - **Local**
  - **System**

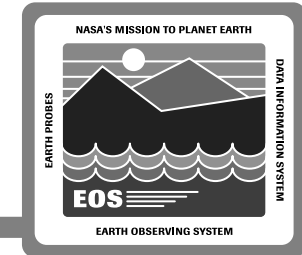
# Candidate Scenarios (cont.)

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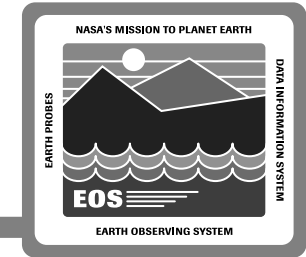
- **Security Management**
  - Local
  - System
- **WAN N/W Management**
- **Performance Management**
  - Local
  - System
- **Accounting and Billing**
  - Local
  - System
- **System Administration (data bases, parameters, controls)**
- **Algorithm I&T**
- **Configuration Management**
- **Backup and Recovery**
- **User Registration**

# Release A Automated and Manual Features



<u>Function</u>	<u>Automated Features</u>	<u>Manual Features</u>	<u>Manual by Whom</u>
Local system mgt	Fault monitoring Security monitoring Performance monitoring Statistics collection	Fault resp & mgt Security resp & mgt Trend analyses Trend analyses	Operations Operations <i>Day Staff</i> <i>Day Staff</i>
Data management	Tools and data provided	User services support	Operations
Support services	Tools and data provided	Config mgt Resource mgt System eng Logistics System admin	<i>Day Staff</i> <i>Day Staff</i> <i>Day Staff</i> <i>Day Staff</i> <i>Day Staff</i>
Data ingest	Data receipt & staging Data archive	Media ingest	Operations
Data server	Data staging Data server operations	Data server mgt	Operations
Data archive	Archive operations	Archive mgt	Operations
Data distribution	Electronic data dist	Hard media dist	Operations
Science processing	Product generation	Fault resp & mgt	Operations
Production planning	Plan expansion	Plan develop	Operations

# ECS M&O Staffing Analyses



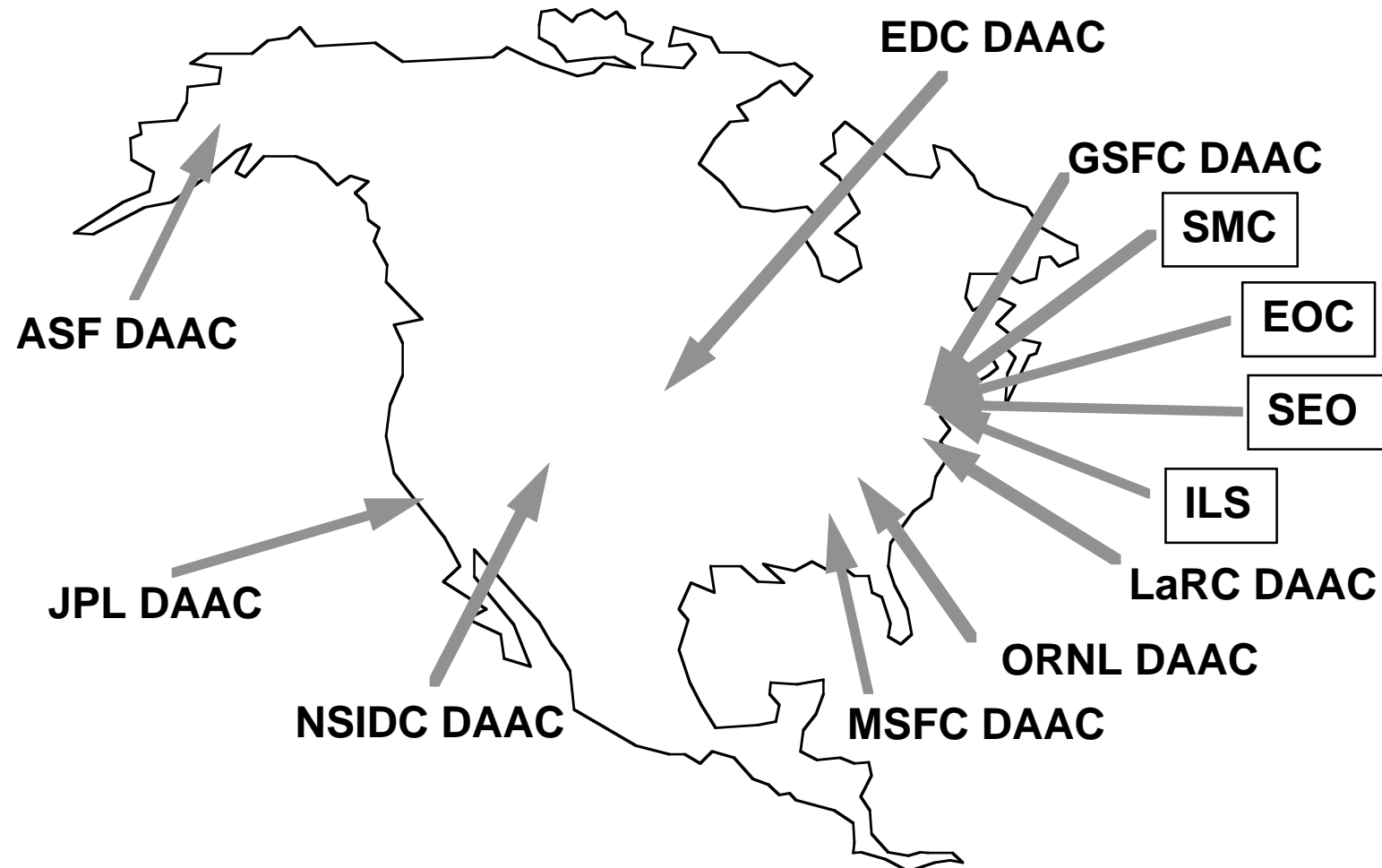
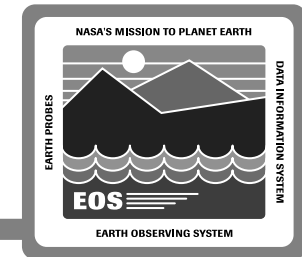
- **DAACs:**

- Alaska SAR Facility
- EROS Data Center
- Goddard Space Flight Center
- Jet Propulsion Laboratory
- Langley Research Center
- Marshall Space Flight Center
- National Snow and Ice Data Center
- Oak Ridge National Laboratory

- System Monitoring and Coordination Center
- EOS Operations Center
- Sustaining Engineering Organization
- System Integrated Logistics Support

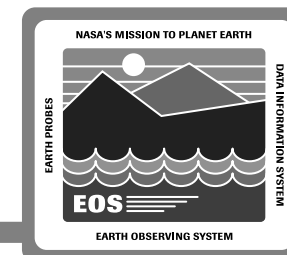
ASF	Fairbanks, AK
EDC	Sioux Falls, SD
GSFC	Greenbelt, MD
JPL	Pasadena, CA
LaRC	Hampton, VA
MSFC	Huntsville, AL
NSIDC	Boulder, CO
ORNL	Oak Ridge, TN
SMC	Greenbelt, MD
EOC	Greenbelt, MD
SEO	Greenbelt, MD
ILS	Greenbelt, MD

# ECS M&O Staffing Analyses



# LaRC Detailed Staffing Analysis

## Day Staff Functions



LaRC DAAC							
Milestone	IR-1 Install	Rel A CSR	Rel A RRR	TRMM (L-3)			AM-1 Launch
Start Date	Nov-95	Oct-96	Jan-97	May-97	Jan-98	Mar-98	Jul-98
Contr Sr DAAC Rep		1.00	1.00	1.00	1.0	1.0	1.0
Admin Support		1.00	1.00	1.00	1.0	1.0	1.0
Ops Reads & Perf Assur		0.50	0.50	0.50	0.5	0.5	
SUSTAINING ENGR							
Engineer		3.00	3.00	5.00	5.0	5.0	5.0
S/W Maint			3.00	3.00	3.0	3.0	3.0
Science					1.0	1.0	1.0
Config Mgt		1.00	1.00	1.00	1.0	1.0	1.0
Testing		1.00	1.00	2.00	2.0	2.0	2.0
Prop Mgt/ILS	0.50	1.00	1.00	1.00	1.0	1.0	1.0
Rsrc Plnr/Perf Analyst		0.50	0.50	0.50	0.5	0.5	1.0
Algorithm Tech Support				7.00	8.0	1.0	1.0
DAAC Assistance		1.00	1.00	2.00	1.0	2.0	2.0
DAAC System Engr. liaison	1.00	1.00	1.00	1.00			
DAAC Science liaison	1.00	1.00	1.00	1.00			
Day Staff Total	2.50	12.00	15.00	26.00	25.00	19.00	19.00

LaRC

ASF

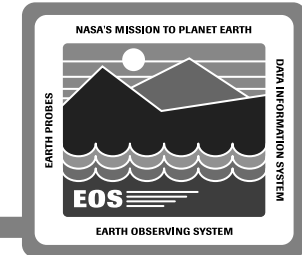
EDC

GSFC

JPL

# LaRC Detailed Staffing Analysis

## Operations Staff Functions



Milestone	IR-1 Install	Rel A CSR	Rel A RRR	TRMM (L-3)			AM-1 Launch
Start Date	Nov-95	Oct-96	Jan-97	May-97	Jan-98	Mar-98	Jul-98
Ops. Supv		0.25	0.25	0.25	0.25	0.25	0.50
Prod Sched		0.25	0.25	0.25	0.25	0.25	0.50
QA/Prod Monitor		1.50	1.50	4.50	8.80	8.80	14.40
Ground Controller		1.00	1.00	2.00	2.80	2.80	5.70
User Services Support							
Data Specialist		2.00	2.00	2.00	7.00	7.00	7.00
User Assistance		1.00	1.00	0.00	3.00	3.00	3.00
Ingest/ Distr		1.00	1.00	3.00	3.00	3.00	3.00
Archive Manager		1.00	1.00	2.00	2.80	2.80	6.70
Sys Admin	1.00	1.00	1.00	2.00	4.20	4.20	6.10
Data Base Admin		1.00	1.00	3.00	3.00	3.00	3.00
H/W Maintenance	0.50	1.00	1.00	2.00	2.80	2.80	4.70
Algorithm Tech Support						8.00	8.00
Shift Staff Total	1.50	11.00	11.00	21.00	37.90	45.90	62.60
TOTAL LaRC DAAC	4.00	23.00	26.00	47.00	62.90	64.90	81.60

LaRC

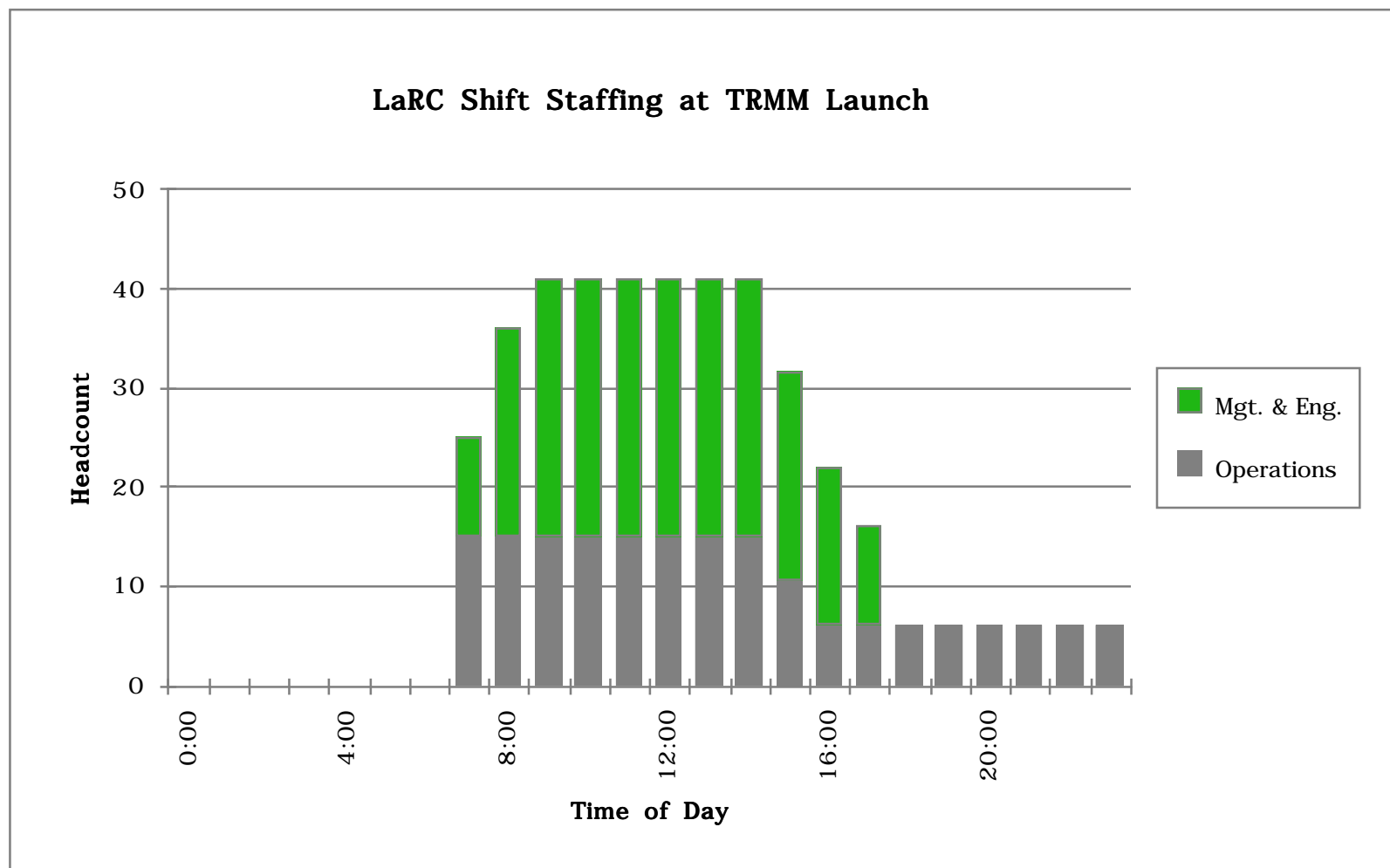
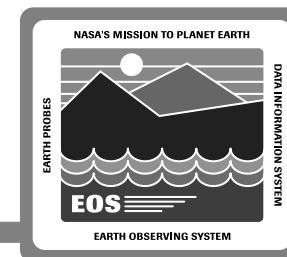
ASF

EDC

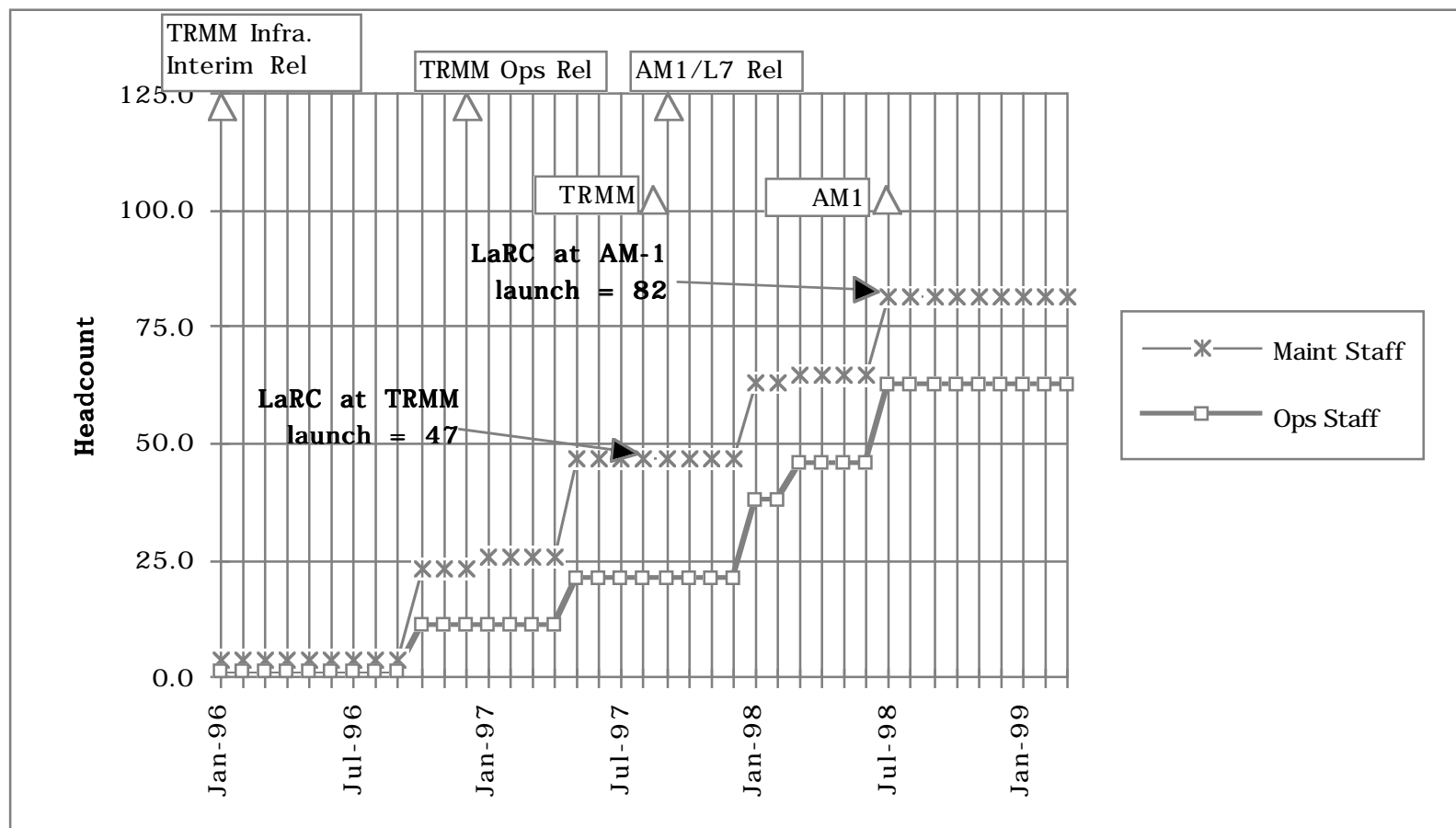
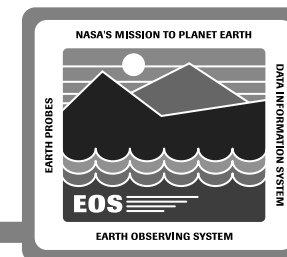
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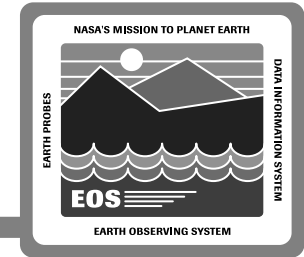
# LaRC Staffing at TRMM Launch Example



# LaRC Staffing for ECS M&O



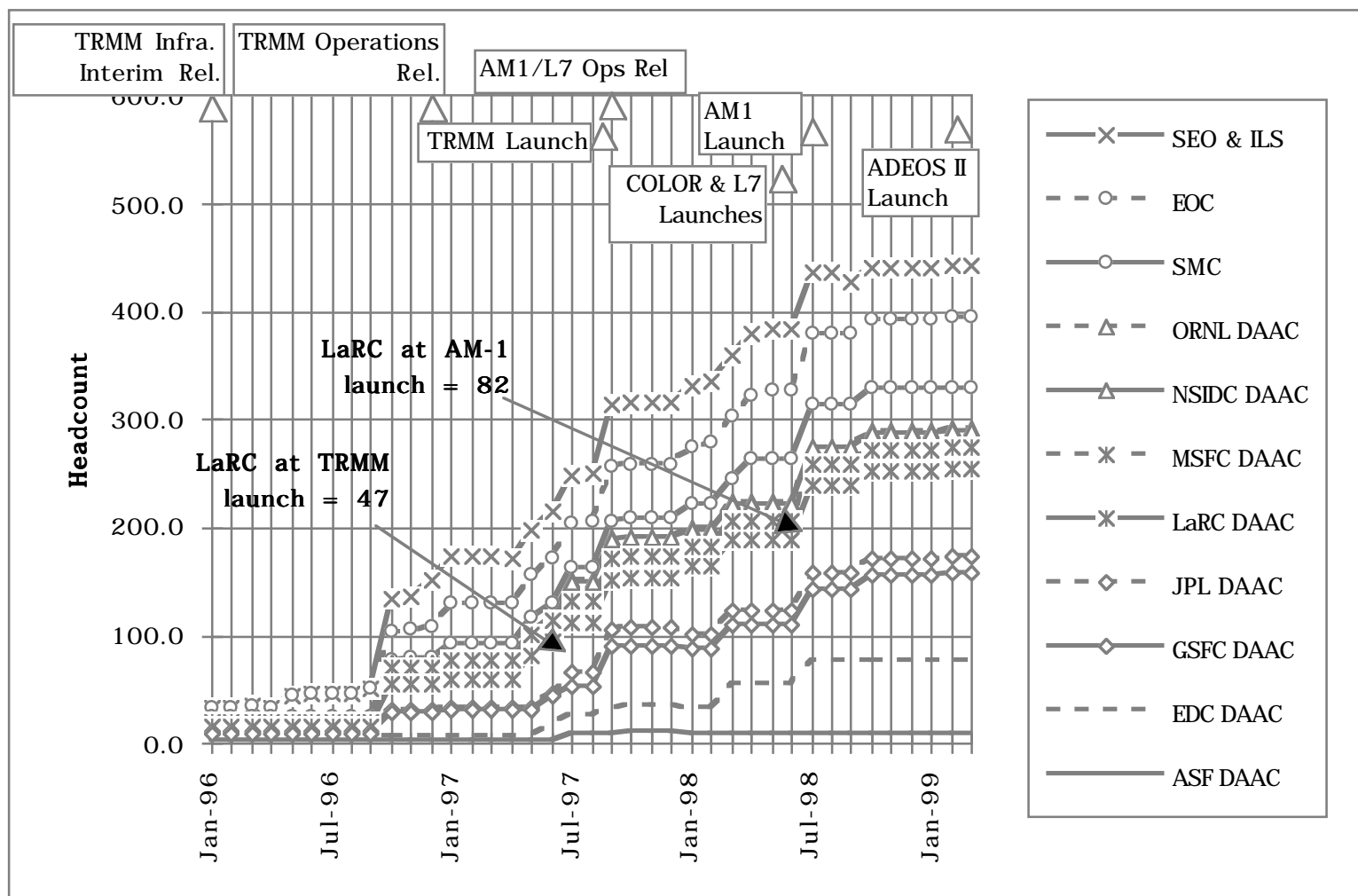
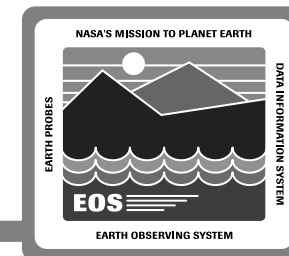
# System Wide M&O Staffing



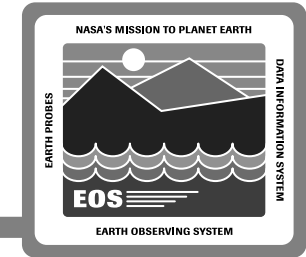
- **Staffing data caveats:**

- Management, sustaining engineering, and operations at all DAACs except ORNL (System Engineering liaison only)
- Independent of what organization provides the staff
- Subject to negotiation between ECS Contractor and ESDIS as part of Change Order 2
- Custom & COTS software maintenance for all ECS Releases
- Hardware maintenance and computer operations for all ECS hardware delivered during period of contract
- ECS mission responsibilities for:
  - WAN operations and System Monitoring & Coordination
  - TRMM
  - EOS-AM1
  - Landsat 7
  - Radarsat data distribution and high order product archive
  - COLOR
  - ADEOS II
  - V0 migrated data

# System Wide M&O Staffing

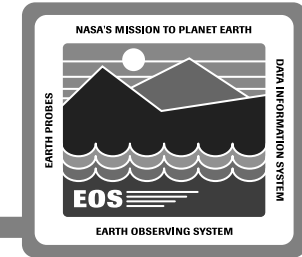


# Plan Development



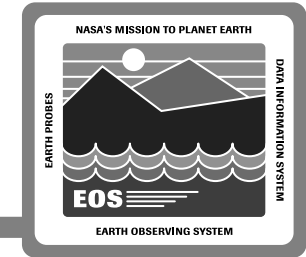
- |  |                |  |
|--|----------------|--|
| • <b>M&amp;O Management Plan</b>       | <b>DID 601</b> | <b>Management system, controls, functions, policies, procedures and documentation to be utilized in fulfilling the M&amp;O requirements of each site</b> |
| • <b>Property Management Plan</b>      | <b>DID 602</b> | <b>Control of property, documenting a continuous audit trail from receipt until transfer of accountability or disposal</b>                               |
| • <b>COTS Maintenance Plan</b>         | <b>DID 613</b> | <b>Policies and procedures to be applied to maintenance of all COTS HW &amp;SW</b>   |
| • <b>Developed SW Maintenance Plan</b> | <b>DID 614</b> | <b>Specifies the policies and procedures for SW maintenance</b>  |

# Plan Development (cont.)



- |  |                |   |
|--|----------------|---|
| • <b>Special Maintenance and Test Equip.</b> | <b>DID 615</b> | <b>No special maintenance and test equipment identified</b>   |
| • <b>Logistics Support Analysis</b>          | <b>DID 617</b> | <b>Determines and evaluates the logistics support required for the system</b>                                     |
| • <b>ECS Training Plan</b>                   | <b>DID 622</b> | <b>Training required to prepare personnel to operate, maintain and utilize the ECS in support of EOS missions</b> |

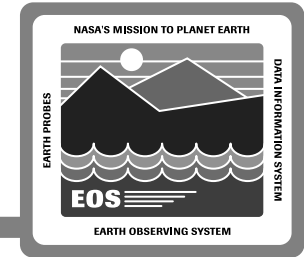
# M&O Related CDRs for CDR



• ECS Facilities Plan	DID 302	Raised floor space, cooling, power, office space
• ECS Operations Concept Document	DID 604	Describes how ECS will appear to its users. Describes the relationship of the ECS to operational and user tasks
• Operations Scenarios	DID 605	Ops scenarios & display formats
• M&O Manual	DID 607	Roles and responsibilities of M&O personnel
• COTS Maintenance Plan	DID 613	Approach to maintenance of COTS HW and SW
• Developed SW Maintenance Plan	DID 614	Approach to maintenance of developed SW
• Integrated Support Plan	DID 616	ILS structure and tools
• Replacement Parts List & Spare Parts List	DID 618	Replacement parts and sources
• Test & Support Equipment Requirements List	DID 619	Test and support equipment

# Focus on Operations

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- **Assign experience operations staff from M&O into development organizations**
- **Resume Operations Telecons**
- **Refine staffing level and skill mix estimates**
- **Develop M&O CDRLs**
- **Support system CDRLs**
- **Operations Scenario Workshop**